

Date: Mon, 21 Mar 94 04:30:32 PST  
From: Ham-Space Mailing List and Newsgroup <ham-space@ucsd.edu>  
Errors-To: Ham-Space-Errors@UCSD.Edu  
Reply-To: Ham-Space@UCSD.Edu  
Precedence: Bulk  
Subject: Ham-Space Digest V94 #66  
To: Ham-Space

Ham-Space Digest                      Mon, 21 Mar 94                      Volume 94 : Issue    66

Today's Topics:

2-Line Orbital Elements WEA-9403.19.1994  
ANS-078 BULLETINS  
FAQ Available? (3 msgs)

Send Replies or notes for publication to: <Ham-Space@UCSD.Edu>  
Send subscription requests to: <Ham-Space-REQUEST@UCSD.Edu>  
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Space Digest are available  
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-space".

We trust that readers are intelligent enough to realize that all text  
herein consists of personal comments and does not represent the official  
policies or positions of any party. Your mileage may vary. So there.  
-----

Date: 20 Mar 94 13:23:42 GMT  
From: news-mail-gateway@ucsd.edu  
Subject: 2-Line Orbital Elements WEA-9403.19.1994  
To: ham-space@ucsd.edu

SB KEPS @ AMSAT \$WEA-9403.19.1994  
2-Line Orbital Elements WEA-9403.19  
HR LU7AKC ORBITAL ELEMENTS FOR WEATHER SATELLITES  
BID: \$WEA-9403.19

DECODE THE 2-LINE ELEMENT SETS WITH  
1 AAAAAU 00 0 0 BBBB.BBBBBBBB .CCCCCCC 00000-0 00000-0 0 DDDZ  
2 AAAAA EEE.EEEE FFF.FFFF GGGGGGG HHH.HHHH III.IIII JJ.JJJJJJJKKKKKZ  
KEY: A-CATALOGNUM B-EPOCHTIME C-DECAY D-ELSETNUM E-INCLINATION F-RAAN  
G-ECCENTRICITY H-ARGPERIGEE I-MNANOM J-MNMOTION K-ORBITNUM Z-CHECKSUM

TO ALL RADIO AMATEURS BT

DMSP B5B-04  
1 05557U 71087 A 94046.08810487 0.00000101                      64466-4 0 5676

2 05557 99.1302 271.2998 0054691 41.4940 319.0370 14.23237080157605  
 DMSP B5C-06  
 1 06275U 72089 A 94043.58145448 0.00000113 69459-4 0 6656  
 2 06275 98.6254 259.9974 0037230 261.6379 98.0581 14.22810055101034  
 DMSP B5D1-3  
 1 10820U 78042 A 94046.03932775 0.00000177 87583-4 0 3646  
 2 10820 98.6551 237.5422 0009797 10.8342 349.3042 14.28777806821413  
 DMSP B5D2-1  
 1 13736U 82118 A 94047.02963511 0.00000091 38806-4 0 3498  
 2 13736 098.6319 238.7353 0008727 354.9829 005.1796 14.25611469579540  
 DMSP B5D2-2  
 1 14506U 83113 A 94043.48306532 0.00000124 72424-4 0 8665  
 2 14506 98.3695 219.2545 0011903 179.0920 181.0280 14.23714656531376  
 DMSP B5D2-3  
 1 18123U 87053 A 94048.04427424 -.00000196 00000-0 0 3125  
 2 18123 098.7855 241.5003 0014058 162.1766 198.0438 14.15334286344013  
 DMSP B5D2-4  
 1 18822U 88006 A 94048.03168228 -.00000006 00000-0 0 4168  
 2 18822 098.4546 267.8701 0006544 339.4454 020.6971 14.22927426313439  
 DMSP B5D2-5  
 1 20978U 90105 A 94048.08845942 0.00000231 82900-4 0 5169  
 2 20978 098.6983 111.3429 0079724 157.6860 202.8333 14.32373273167914  
 DMSP B5D2-6  
 1 21798U 91082 A 94048.06239186 0.00000160 85084-4 0 1758  
 2 21798 098.9625 053.6274 0013310 119.4953 240.8130 14.13765141114642  
 GOES 2 R  
 1 10062U 77048 B 94044.91764046 0.00000181 25789-4 0 3676  
 2 10062 28.4191 2.3423 0761928 193.3964 164.5242 13.30796042807866  
 GOES 3 R  
 1 07735U 75027 B 94047.96577140 0.00000127 57362-4 0 3682  
 2 07735 114.9817 056.7234 0040715 192.4938 167.5052 14.21823840977478  
 GOES 6 R  
 1 14051U 83041 B 94045.17695222 0.00001914 20866-3 0 4885  
 2 14051 25.3429 352.7455 1352659 163.1101 201.9315 12.50792293485270  
 OKEAN 1  
 1 19274U 88056 A 94047.89924351 0.00000169 21204-4 0 8644  
 2 19274 082.5168 348.1892 0020890 047.4068 312.9544 14.82089035303260  
 OKEAN 1 R  
 1 19275U 88056 B 94045.85612777 0.00000252 32030-4 0 2629  
 2 19275 82.5170 358.4007 0023949 81.6804 278.7120 14.77324394302422  
 OKEAN 2  
 1 20510U 90018 A 94047.76877289 0.00000274 37783-4 0 2654  
 2 20510 082.5244 296.6799 0018240 222.0501 137.9960 14.78256509213873  
 OKEAN 2 R  
 1 20511U 90018 B 94040.18173672 0.00000159 20334-4 0 8639  
 2 20511 82.5266 307.6777 0017361 265.5410 94.3826 14.75088343212491  
 OKEAN 3  
 1 21397U 91039 A 94047.97346102 0.00000583 84183-4 0 9667

2 21397 082.5233 208.0021 0022170 292.7507 067.1947 14.76123763145772  
 OKEAN 3 D  
 1 21842U 91039 C 94045.84090004 0.00001263 16230-3 0 5651  
 2 21842 82.5239 206.1257 0020227 288.0675 71.8331 14.80306886145726  
 OKEAN 3 R  
 1 21398U 91039 B 94046.46287310 0.00000188 24614-4 0 6656  
 2 21398 82.5238 210.6962 0022507 306.4452 53.4677 14.74895009145479  
 TIROS 2  
 1 00063U 600PI1 94043.56348375 0.00000778 88819-4 0 4621  
 2 00063 48.5252 224.5938 0045749 248.3930 111.2115 14.96402064790822  
 TIROS 10 D  
 1 01440U 65051C 94044.63529445 0.00030785 48911-3 0 5292  
 2 01440 98.5290 290.2793 0023036 122.5668 237.7879 15.52987427536715  
 TIROS N  
 1 11060U 78096 A 94044.70090970 0.00000031 37948-4 0 8651  
 2 11060 98.6771 101.9352 0010101 261.4638 98.5392 14.15589441 5768  
 NOAA-9  
 1 15427U 84123A 94074.03402688 .00000126 00000-0 90853-4 0 7505  
 2 15427 99.0656 123.3704 0015705 122.8642 237.4045 14.13597974477046  
 NOAA-10  
 1 16969U 86073A 94073.99072129 .00000108 00000-0 64636-4 0 6475  
 2 16969 98.5121 85.8616 0012156 244.1267 115.8662 14.24872785389191  
 MET-2/17  
 1 18820U 88005A 94076.18240290 .00000127 00000-0 99308-4 0 2729  
 2 18820 82.5456 341.7797 0018514 79.0102 281.3131 13.84711418309624  
 MET-3/2  
 1 19336U 88064A 94072.89393314 .00000051 00000-0 10000-3 0 2689  
 2 19336 82.5411 31.1102 0017651 137.2192 223.0298 13.16965600270718  
 NOAA-11  
 1 19531U 88089A 94073.96248747 .00000086 00000-0 71361-4 0 5590  
 2 19531 99.1660 60.5963 0012728 40.9981 319.2144 14.12967309281919  
 MET-2/18  
 1 19851U 89018A 94075.85339731 .00000027 00000-0 10933-4 0 2716  
 2 19851 82.5182 217.5195 0015409 122.8587 237.3935 13.84358686254919  
 MET-3/3  
 1 20305U 89086A 94075.88142870 .00000044 00000-0 10000-3 0 43  
 2 20305 82.5576 333.8085 0006499 152.2875 207.8581 13.04425109210860  
 MET-2/19  
 1 20670U 90057A 94075.63449506 .00000024 00000-0 79036-5 0 7734  
 2 20670 82.5434 281.9855 0017468 47.7992 312.4642 13.84190213187814  
 FY-1/2  
 1 20788U 90081A 94076.22426307 -.00000172 00000-0 -85968-4 0 9199  
 2 20788 98.8393 99.2948 0013308 265.4548 94.5096 14.01312219180823  
 MET-2/20  
 1 20826U 90086A 94071.91097536 .00000059 00000-0 40218-4 0 7814  
 2 20826 82.5228 222.5667 0012920 323.8660 36.1626 13.83574515174445  
 MET-3/4  
 1 21232U 91030A 94071.87651682 .00000051 00000-0 10000-3 0 6792

2 21232 82.5362 237.6665 0014715 65.8899 294.3776 13.16460820138681  
 NOAA-12  
 1 21263U 91032A 94074.00396538 .00000180 00000-0 10013-3 0 9646  
 2 21263 98.6278 103.8182 0013418 145.8585 214.3456 14.22379795147143  
 MET-3/5  
 1 21655U 91056A 94076.19735930 .00000051 00000-0 10000-3 0 6877  
 2 21655 82.5556 181.6999 0014730 67.7742 292.4937 13.16828055124353  
 MET-2/21  
 1 22782U 93055A 94072.07378319 .00000044 00000-0 26732-4 0 2819  
 2 22782 82.5479 282.6058 0022877 131.3043 229.0093 13.83002641 26809  
 /EX

-----  
 Date: Sun, 20 Mar 1994 09:44:24 MST  
 From: pacbell.com!sgiblab!swrinde!cs.utexas.edu!howland.reston.ans.net!  
 news.cac.psu.edu!news.pop.psu.edu!ctc.com!news.mic.ucla.edu!unixg.ubc.ca!  
 nntp.cs.ubc.ca!alberta!@@ihnp4.ucsd.edu  
 Subject: ANS-078 BULLETINS  
 To: ham-space@ucsd.edu

SB SAT @ AMSAT \$ANS-078.01  
 PHASE-3D STATUS REPORT

HR AMSAT NEWS SERVICE BULLETIN 078.01 FROM AMSAT HQ  
 SILVER SPRING, MD MARCH 19, 1994  
 TO ALL RADIO AMATEURS BT  
 BID: \$ANS-078.01

# AMSAT PHASE 3-D INTERNATIONAL SATELLITE BUILDERS MEET IN MARBURG--PROPELLANT TANKS DELIVERED

During the week of February 10-16, 1994, Dr. Karl Meinzer, DJ4ZC, AMSAT-DL President and Project Leader for the International AMSAT Phase-3D satellite, and Werner Haas, DJ5KQ, Vice-President of AMSAT-DL hosted a working meeting in Marburg, Germany to discuss recent progress on the project. Agenda items centered primarily around the spacecraft's electronic systems including the on-board computer (IHU) and RUDAK systems, as well as the progress now being made by team members on the spacecraft's other electronic modules.

Also during the meeting, the team took delivery of P3-D's main propellant tanks. The tanks were manufactured in Russia under contract from AMSAT-DL and in accordance with AMSAT specifications. Seven tanks were delivered, although one had been subjected to a destructive pressure test by its Russian manufacturer.

Not only have all the propellant tank specifications been fully achieved, but they've actually been significantly surpassed. Each tank can accommodate almost 50 liters of propellant. Favorable conditions for the purchase and delivery of these tanks was arranged through the efforts of AMSAT-UA (Russia). Following a brief inspection, the tanks were immediately shipped to Orlando, Florida, where integration of the satellite is now slated to begin this summer.

Dick Jansson, WD4FAB, AMSAT-NA Vice-President for Engineering, also attended the meeting, principally to discuss various aspects of the satellite's structure with Dr. Meinzer and Konrad Mueller, DG7FDQ. He reported on the good progress of the flight model structure's construction, currently underway at Weber State University in Utah.

Also in attendance were Lyle Johnson, WA7GXD, Peter Guelzow, DB2OS, and Gerhard Metz, DG2CV. Lyle is known through his work with the Tucson Amateur Packet Radio (TAPR) group (which he co-founded) as well as for his work on the Microsats and on the P3-D GPS project. After much discussion, the team decided to again employ a cable wiring harness arrangement for Phase 3-D, similar to that used on AO-10 and AO-13, rather than an AART-based LAN design. However, the team decided to also fly a CAN bus and DB2OS's experimental LAN controller as part of the spacecraft's digital (RUDAK) transponder.

In a related decision, the group concluded that the AO-10/AO-13 1802-based Internal Housekeeping Unit (IHU) computer design would still be adequate for P3-D with some minor modifications. Lyle Johnson announced his willingness to redesign the IHU and to construct a flight unit. His offer was greatfully accepted.

Other meeting items centered on P3-D's RUDAK work now being done by Peter Guelzow, Gerhard Metz, and Dr. Stefan Eckart, DL2MDL. This team has now decided to build two RUDAKs. The first will be a user-oriented digital communications module constructed by Lyle Johnson, in close cooperation with Peter Guelzow. This RUDAK, which has yet to be formally named, will be the one most P3-D satellite users will operate. A second, more experimental RUDAK (called RUDAK-E), will be built in Germany. It will promote experiments with advanced high speed modems, Digital Signal Processing (DSP) techniques, and new communications protocols.

In a host of other issues, Daniel Orban, ON4AOD, discussed details of the 24 GHz transmitter. Konrad Hupfer, DJ1EE, reported his progress in building the 250 watt U-Band (70 cm) final amplifier. Werner Haas displayed his first flight hardware consisting of two command receivers, a digital section, and the 70 cm exciter that will drive Konrad's 70 cm final amplifier. Freddy de Guchteneirie, ON6UG, reported his progress on the construction of dual V-Band and U-Band receiver "front-ends". Dr. Matjaz Vidmar, S51MV, reported he has now begun construction of the

HF-Band, C-Band and S-Band receivers. He expects to deliver working prototypes in May.

While much work still remains to be done, Dr. Meinzer expressed his approval and sincere thanks to all participants for their superb work and close cooperation on this vitally important AMSAT international project. A complete text of this meeting's minutes has been prepared by Peter Guelzow, and has since been translated by Don Moe, DJ0HC/KE6MN. The text will be made available to the various international AMSAT Journals for possible inclusion in their upcoming editions.

[The AMSAT News Service (ANS) would like to thank Peter Guelzow, DB2OS, Don Moe, DJ0HC/KE6MN, Lyle Johnson, WA7GXD, and Keith Baker, KB1SF, for their assistance in writing, translating, and formatting the information contained in this bulletin item.]

/EX

SB SAT @ AMSAT \$ANS-078.02  
ITAMSAT-OSCAR-26 PROBLEM

HR AMSAT NEWS SERVICE BULLETIN 078.02 FROM AMSAT HQ  
SILVER SPRING, MD MARCH 19, 1994  
TO ALL RADIO AMATEURS BT  
BID: \$ANS-078.02

ITAMSAT-OSCAR-26 (IO-26) Ground Team Discovers Problem

Starting last week the PSK modulation on the primary trasmitter became more and more difficult to decode. A residual carrier and lower output power seem to indicate a failure in the PSK balanced modulator, being worse at the current low power setting. Increasing the power level makes the de-modulation better but is not accetable due to power budget constraints. Ground controllers decided to switch to the secondary PSK trasmitter on 435.822 MHz. The first two passes over Italy confirmed the correct operation of the spacecraft and WOD are being taken to analize the performance of the satellite in this new configuration. BBS is working as usual and status bulletin will be uploaded in the next few days.

73 de ITAMSAT (IO-26) Command Team

/EX

SB SAT @ AMSAT \$ANS-078.03  
AO-13 OPERATIONS NET SCHEDS

HR AMSAT NEWS SERVICE BULLETIN 078.03 FROM AMSAT HQ  
SILVER SPRING, MD MARCH 19, 1994  
TO ALL RADIO AMATEURS BT  
BID: \$ANS-078.03

## Current AMSAT Operations Net Schedule For AO-13

AMSAT Operations Nets are planned for the following times. Mode-B Nets are conducted on AO-13 on a downlink frequency of 145.950 MHz. If, at the start of the OPS Net, the frequency of 145.950 MHz is being used for a QSO, OPS Net enthusiasts are asked to move to the alternate frequency of 145.955 MHz.

Date	UTC	Mode	Phs	NCS	Alt NCS
26-Mar-94	2130	B	084	WA5ZIB	W5IU

Any stations with information on current events would be most welcomed. Also, those interested in discussing technical issues or who have questions about any particular aspect of OSCAR statellite operations, are encouraged to join the OPS Nets. If neither of the Net Control Stations show up, any participant is invited to act as the NCS.

## AO-13 ZRO Tests For March 1994

The following schedule of Mode "B" tests were chosen for convenient operating times and favorable squint angles. The tests can be heard on 145.840 MHz. Andy McAlister (WA5ZIB) will conduct all the tests. Mode "JL" tests will no longer occur due to the failure of AO-13's 70CM transmitter.

Day	Date (UTC)	Time	Areas covered
Saturday	Mar. 26, 1994	2315 UTC	NA, SA

Note that the dates and days are shown in "UTC". Any changes will be announced as soon as possible via the AMSAT HF and AO-13 Operations Nets.

All listener reports with date of test and numbers copied should be sent to Andy McAllister (WA5ZIB), AMSAT V.P. User Operations, 14714 Knights Way Drive, Houston, TX 77083-5640. A report will be returned verifying the level of accurate reception. An S.A.S.E. is appreciated but not required.

## SSTV ON OSCAR 13

Slow scanners are invited to join the SSTV sessions on AO-13. The frequency is 145.955 MHz. The net meets at 45 minutes before Mode S, and on Mode B following Mode S on Saturdays and Sundays. Join those sessions or convey your wishes for other skeds to [wb6llo@amsat.org](mailto:wb6llo@amsat.org), and he will coordinate your efforts.

/EX

SB SAT @ AMSAT \$ANS-078.04

SAREX STS-59 CORRECTION

HR AMSAT NEWS SERVICE BULLETIN 078.04 FROM AMSAT HQ

SILVER SPRING, MD MARCH 19, 1994

TO ALL RADIO AMATEURS BT

BID: \$ANS-078.04

Correction To NASA Landline BBS Phone Number

Last week's AMSAT News Service (ANS) ANS-071.02 bulletin referred to the NASA Info Board BBS at Johnson Space Center as a source of information for Keplerian elements and SAREX bulletins. This bulletin board system was operated and maintained by the Public Affairs Office of the Johnson Space Center and is now no longer operational.

Johnson Space Center Amateur Radio Club is currently seeking a way to get a small BBS up and running prior to the flight. As soon as a system is established, an announcement will be issued to promulgate and distribute the telephone number.

73,

Dale Martin, KG5U @ KA5KTH.#setx.tx.usa.na

Sec'y, Johnson Space Center ARC

Houston, Texas

/EX

SB SAT @ AMSAT \$ANS-078.05

WEEKLY OSCAR STATUS REPORTS

HR AMSAT NEWS SERVICE BULLETIN 078.05 FROM AMSAT HQ

SILVER SPRING, MD MARCH 19, 1994

TO ALL RADIO AMATEURS BT

BID: \$ANS-078.05

Weekly OSCAR Status Reports: 19-MAR-94

A0-13: Current Transponder Operating Schedule:

M QST \*\*\* A0-13 TRANSPONDER SCHEDULE \*\*\* 1994 Mar 19-Apr 04

Mode-B : MA 0 to MA 90 |

Mode-BS : MA 90 to MA 120 |

Mode-S : MA 120 to MA 122 |<- S beacon only

Mode-S : MA 122 to MA 145 |<- S transponder; B trsp. is OFF

Mode-S : MA 145 to MA 150 |<- S beacon only

Mode-BS : MA 150 to MA 180 | Alon/Alat 180/0

Mode-B : MA 180 to MA 256 |

Omnis : MA 230 to MA 30 | Move to attitude 235/0, Apr 04 240/0, Apr 04



[G3RUH/DB20S/VK5AGR]

FO-20: The following is the current schedule for transponder operations:  
ANALOG MODE:

23-MAR-94 7:52 -TO- 30-MAR-94 8:15 UTC

DIGITAL MODE: Unless otherwise noted above.  
[Kazu Sakamoto (JJ1WTK) qga02014@niftyserve.or.jp]

A0-16: Operating normally. [WH6I]

L0-19: Operating normally. [WH6I]

I0-26: Operating normally. [WH6I]

K0-23: Operating normally. [WH6I]

The AMSAT NEWS Service (ANS) is looking for volunteers to contribute weekly OSCAR status reports. If you have a favorite OSCAR which you work on a regular basis and would like to contribute to this bulletin, please send your observations to WD0HHU at his CompuServe address of 70524,2272, on INTERNET at wd0hhu@amsat.org, or to his local packet BBS in the Denver, CO area, WD0HHU @ W0LJF.#NECO.CO.USA.NOAM. Also, if you find that the current set of orbital elements are not generating the correct AOS/LOS times at your QTH, PLEASE INCLUDE THAT INFORMATION AS WELL. The information you provide will be of value to all OSCAR enthusiasts.

/EX

-----

Date: Sun, 20 Mar 1994 15:47:58 GMT  
From: ihnp4.ucsd.edu!agate!howland.reston.ans.net!wupost!crcnis1.unl.edu!  
news.unomaha.edu!cwis!pschleck@network.ucsd.edu  
Subject: FAQ Available?  
To: ham-space@ucsd.edu

In <9403200930.AA13571@emh.yokota.af.mil> watersk@emh.yokota.af.MIL (Ken Waters)  
writes:

>Hello, I would like to find a FAQ on packet satellite communications. Does  
>anyone know if such a thing exists? I found a FAQ on packet radio but not  
>pacsat. I would like to begin working it but need to know the basics  
>including the equipment needed. Thanks.  
>Ken/N4PBY

On or about Feb 28th, Stephen Holmstead (stephen@hpdmlge.boi.hp.com) posted

a fairly comprehensive amateur radio in space FAQ. I wrote him a while back and made some suggestions, particularly in regard to making it available via several FTP archives that would be glad to have it, but haven't heard anything from him since.

Perhaps if you dropped him a line, and asked nicely, he would send you a copy.

--

73, Paul W. Schleck, KD3FU  
pschleck@unomaha.edu

-----

Date: Sun, 20 Mar 94 06:36:02 GMT  
From: news.mtholyoke.edu!nic.umass.edu!usenet@uunet.uu.net  
Subject: FAQ Available?  
To: ham-space@ucsd.edu

In Article <9403200930.AA13571@emh.yokota.af.mil>  
watersk@emh.yokota.af.MIL (Ken Waters) writes:

>Hello, I would like to find a FAQ on packet satellite communications. Does  
>anyone know if such a thing exists? I found a FAQ on packet radio but not  
>pacsat. I would like to begin working it but need to know the basics  
>including the equipment needed. Thanks.

I just found such a FAQ in 4 parts, posted in the last week or so to the AX.25 packet network here in the US by KD2BD. As is so often the case with multi-part posts to the ham BBS network only 2 parts made it to my local BBS. I wrote to KD2BD and I am hoping he will either post it here or put it on an ftp site.

73, Al N1AW

Albert S. Woodhull, Hampshire College, Amherst, MA, USA  
awoodhull@hamp.hampshire.edu

-----

Date: Sun, 20 Mar 94 09:13:35 GMT  
From: ihnp4.ucsd.edu!pacbell.com!sgiblab!swrinde!emory!sol.ctr.columbia.edu!  
hamblin.math.byu.edu!news.byu.edu!news.mtholyoke.edu!nic.umass.edu!  
usenet@network.ucsd.edu  
Subject: FAQ Available?  
To: ham-space@ucsd.edu

In Article <2mhttu\$bao@nic.umass.edu> I wrote:

>I just found such a FAQ in 4 parts, posted in the last week or so to  
>the AX.25 packet network here in the US by KD2BD. As is so often the case  
>with multi-part posts to the ham BBS network only 2 parts made it to my  
>local BBS.

I was able to find the missing parts on another BBS and I have posted it to  
this group as Sat FAQ Answers, the title under which it was posted to the  
BBS network.

I presume that further posting is OK with the original authors. What I  
posted seems to be a composite of several different articles and it isn't  
clear who wrote what or who edited the composite document.

73, Al N1AW

Albert S. Woodhull, Hampshire College, Amherst, MA, USA  
awoodhull@hamp.hampshire.edu

-----

End of Ham-Space Digest V94 #66

\*\*\*\*\*  
\*\*\*\*\*